

What is claimed is:

1. A solution for use in a chemical mechanical polishing process comprising an oxidizing agent, a pH controlling agent, a chelate reagent, and deionized water, and not comprising an abrasive.
2. The solution of claim 1, wherein the solution is used for chemical mechanical polishing of a copper metal interconnection layer.
3. The solution of claim 1, wherein the oxidizing agent is hydrogen peroxide ( $\text{H}_2\text{O}_2$ ), an oxidizing agent of a ferric series or an oxidizing agent of an ammonium series.
4. The solution of claim 3, wherein the concentration of hydrogen peroxide is within the range of about 1% to about 20% by weight.
5. The solution of claim 3, wherein the concentration of the oxidizing agent of the ferric series is within the range of about 0.01% to about 5% by weight.
6. The solution of claim 3, wherein the concentration of the oxidizing agent of the ammonium series is within the range of about 0.01% to about 5% by weight.
7. The solution of claim 1, wherein a pH of the solution is within the range of about 2 to about 11.
8. The solution of claim 1, wherein the pH controlling agent is an acidic or a basic solution.

9. The solution of claim 8, wherein the acidic solution is a sulfuric acid solution, a nitric acid solution, a hydrochloric acid solution or a phosphoric acid solution, and the basic solution is a potassium hydroxide solution or an ammonium hydroxide solution.

10. The solution of claim 1, wherein the chelate reagent is citric acid, malic acid, gluconic acid, gallic acid, tannic acid, ethylenediaminetetraacetic (EDTA), benzotriazole (BTA), NHEDTA, nitrilotriacetic acid (NTA), DPTA or EDG.

11. The solution of claim 1, wherein the concentration of the chelate reagent is within the range of about 0.001% to 1% by weight.

12. A method of manufacturing a copper metal interconnection layer comprising the steps of:

(a) forming a recessed region having a predetermined interconnection form in an interdielectric layer;

(b) forming a barrier layer along a stepped portion over the entire surface of the interdielectric layer having the recessed region;

(c) forming a copper seed layer on the barrier layer; and

(d) exposing the barrier layer by chemical mechanical polishing using a solution comprising an oxidizing agent, a pH controlling agent, a chelate reagent, and deionized water, and not comprising an abrasive until a surface of the interdielectric layer is exposed so that the copper seed layer remains only within the recessed region.

13. The method of claim 12, after the step (d), further comprising the steps of:  
forming a copper layer on the copper seed layer formed in the recessed region;  
and

forming a copper metal interconnection layer by planarizing the copper layer projecting above the surface of the interdielectric layer and the barrier layer projecting above the surface of the interdielectric layer.

14. The method of claim 12, wherein the recessed region includes a trench region in the shape of a line recessed from the surface of the interdielectric layer.

15. The method of claim 12, wherein the recessed region includes a combination of a trench region in the shape of a line recessed from the surface of the interdielectric layer, and contact holes or via holes penetrating the interdielectric layer.

16. The method of claim 12, wherein the barrier layer is formed using a material which can prevent diffusion of metal and act as an adhesive layer between the interdielectric layer and the metal interconnection.

17. The method of claim 12, wherein in the step (c), the copper seed layer is formed by physical vapor deposition.